ORCLS - Optical-Radio Coherence for Laser Stability

Completed Technology Project (2016 - 2017)

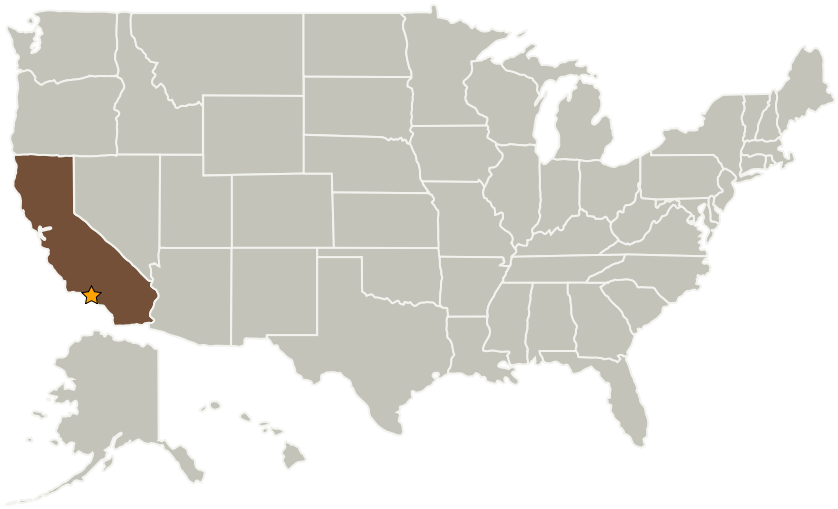
Project Introduction

GRACE 2 laser ranging precision is limited by laser frequency stability. The laser reference cavity meets short-term stability requirements, but fails long-term requirements by a factor of 10. ORCLS uses ultra-stable GPS to provide long-term stability readout. No flight missions to date have incorporated a long-term optical frequency reference. The main products will be a TRL-3 proof of concept of laser frequency relative to RF source and a TRL-4 breadboard demonstration of design appropriate for implementation on GRACE 2.

Anticipated Benefits

Demonstrate laser frequency knowledge stability <= 3e-9 fractional = 1 MHz optical over at least 3 days.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Innovation Fund: JPL CIF

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Primary U.S. Work Locations

California

Project Management

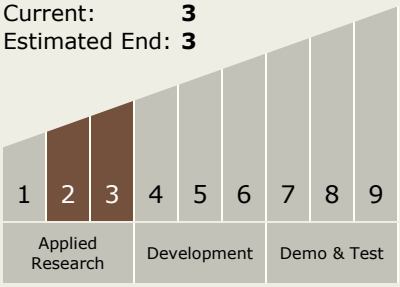
Program Director:
Michael R Lapointe

Program Manager:
Fred Y Hadaegh

Principal Investigator:
Robert E Spero

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destination

Earth